Chemistry

LABORATORY SAFETY MANUAL

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Ontario

Ministry
of the
Environment

LABORATORY SAFETY MANUAL

CENTRAL LABORATORY COMPLEX

MINISTRY OF THE ENVIRONMENT

MAY 1st, 1978

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The material in this document has been prepared by the Laboratory Safety Officer and edited by the members of the Complex Joint Health and Safety Committee

YOUR JOINT HEALTH AND SAFETY COMMITTEE REPRESENTATIVE

IS____

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INTRODUCTION

THE INFORMATION IN THIS MANUAL HAS BEEN PREPARED TO ASSIST YOU IN PERFORMING YOUR TASKS SAFELY.

STAFF CO-OPERATION IS ESSENTIAL IN OBSERVING SAFETY RULES AND REGULATIONS.

COPIES OF THE MOE SAFETY MANUAL ARE AVAILABLE IN YOUR LABORATORY SECTION AND IN THE LIBRARY. DETAILS NOT COVERED IN THIS MANUAL CAN BE FOUND IN THE MINISTRY MANUAL.

LABORATORY SERVICES BRANCH
LABORATORY COMPLEX
125 RESOURCES ROAD
REXDALE, ONTARIO

CODE OF CONDUCT

RELATING TO HEALTH & SAFETY IN THE LABORATORY

PRINCIPLE:

A key goal of the Ministry of the Environment employee Health & Safety Program is the maintenance of a safe work environment. This Code of Conduct has been developed to assist all employees in understanding what is required of management and staff to achieve this goal. The laboratory contains numerous potential hazards such as flammable liquids, infectious and toxic agents, radioactive materials, open flames, compressed gases, electrical instruments, cryogens, glass, poisons, acids and caustics, and substances regulated by law. A variety of individuals - employees, students and visitors - may be exposed to some of these hazards. For their protection, it is essential that each individual laboratory unit develop and maintain an effective site specific safety protocol consistent with the approved health and safety program.

Elements of the Code of Conduct

1. Policy Statement:

(A) It is management policy to ensure that the laboratory complex is operated in a manner that ensures the protection of health and safety of staff. It is the responsibility of all managers, supervisors and staff to follow safety rules and regulations and to properly carry out the health and safety program referenced in this Code of Conduct.

(B) The objectives of management include:
-providing a safe work environment and adequate safety equipment
-ensuring training and supervision are in place and operating
-promoting safe work habits
-ensuring safety regulations are enforced

(C) The objectives of staff include:
-working in a manner that will not endanger oneself or any other person
-working in a manner consistent with the Laboratory health and safety program and the unit safety protocol

The ultimate authority and accountability for Health and Safety in the workplace rests with the Laboratory manager.

Staff have the responsibility to comply with the stipulated workplace safety practice. Adherence to the requirements of this management/staff partnership will ensure a safe work environment for all.

2. Joint Health and Safety Committee:

In accordance with the Occupational Health and Safety Act a Joint Health and Safety Committee is in place and shall be maintained in the Complex.

The Committee shall act on behalf of all personnel to make management and staff aware of hazards, problems, or concerns relating to health and safety. Equally, it should act on behalf of both management and staff to ensure that employees are aware of management efforts to provide a safe workplace.

The activities of the Committee should include:

Identifying health and safety concerns, and making recommendations for corrective action.

Reviewing organizational rules and regulations pertaining to Health and Safety.

Promoting and evaluating training and education in hazard recognition and control.

Reviewing and investigating accident reports.

Workplace inspections.

3. Site Specific Safety Manual:

A written Safety Protocol, consisting of rules, procedures and protective equipment required should be developed for each unique laboratory or laboratory unit. Employees should be familiar with the protocol and be requested to initial a written document signifying the contents have been read and understood.

Together with the Statement of Policy, the Safety Protocol and the Laboratory Complex Safety Manual comprise the Site Specific Safety Manual.

Infractions of the Site Specific Safety rules by any employee should be dealt with by verbal warning followed by a written warning recorded on file. Union and Management should be prepared to discuss appropriate disciplinary action where indicated.

The following philosophy should underline management and staff approach to the completion of work tasks.

If the job cannot be done safely, it should not be done at all.

4. Medical Surveillance Program:

Maintaining a healthy and safe work environment requires the capability to monitor the health of employees when required. The Laboratory Services Branch, in cooperation with the Ministry of Government Services, Employee Health Services, offers the opportunity to all staff to participate in health interviews and subsequent medical surveillance.

A Surveillance Program should consist of the following parts:

1) an initial examination
2) periodic examination
3) preplacement examination
4) special examination

(1) Initial Examination

This examination is intended primarily to serve as a baseline from which deviations will be apparent.

The examining physician is unlikely to have more than a passing acquaintance with a laboratory operation. He will require guidance and assistance from the Supervisor and employee regarding chemical use and frequency or other potential hazards in order to determine appropriate tests.

(2) Periodic Examination

The periodic examination allows the physician to compare findings with those of the initial examination. It also provides an opportunity for health education and promotion.

The frequency will vary with the risk associated with the work. Accurate risk assessment will require cooperation between the laboratory manager/supervisor and the physician.

(3) Preplacement Examination

An additional examination may be required prior to a staff member being transferred from one job to another.

(4) Special Examination

If an unpredicted incident should occur which may have resulted in an unusual exposure, staff or management may request that an additional examination be undertaken.

INTRODUCTION Cont'd

OCCUPATIONAL HEALTH & SAFETY ACT

- this Ontario Statute applies to all workplaces in Ontario
- it imposes joint responsibilities for safe work practices on the employer, supervisor and employee
- copies of the Act are available for review through your manager, the library, and the safety officer
- regulations, filed under the Act dealing with Designated Substances, Industrial, Construction and Mining Safety are available for review through the Safety Office or Library

RESPONSIBILITIES OF SUPERVISOR AND WORKERS

Supervisors shall:

- ensure that safety equipment is used or worn
- ensure that safe procedures are followed
- inform workers of any hazard in the workplace or assigned task
- take every precaution reasonable in the circumstances for the protection of the worker
- complete and sign WCB Form 007 and Supervisors' Accident/ Incident report where necessary. See Page B2 for details

Workers shall:

- work safely, follow safe procedures and use or wear protective equipment
- report any observed hazard to supervisor
- report all accidents, however minor, to the supervisor immediately

ORIENTATION

- orientation and laboratory safety seminars will be held at regular intervals
- notification will be given to confirm dates
- supervisors will instruct all employees on the site specific safety procedures, precautions, protective equipment and hazards of which the supervisor is aware

HEALTH SERVICE

General:

- immunization, x-ray and other medical services are available and are recommended
- advise your supervisor of health problems or disabilities so that prompt attention can be provided in an emergency
- Employee Health Centre, 81 Resources Road, Ministry of Health Laboratory, hours; 8:00-12:00 and 1:00-4:15 - Phone 248-3101

VDT PROGRAM

- the Ministry provides initial and annual eye tests for Regular employees who are required to use VDT equipment more than 2 hrs per day

AUDIOMETRIC TESTS

- the Ministry provides initial and annual tests for those workers employed in a work area where the noise level is 85 dba. Ear protection is provided and should be worn
- personal ear protection is available in the Safety Office for any worker bothered by nuisance noise levels below 85dba

JOINT HEALTH AND SAFETY COMMITTEE

- a Committee, which complies with the Occupational Health and Safety Act, is active in the complex
- a list of the current members is posted on the Safety Bulletin Board in the cafeteria hallway

GENERAL INFORMATION AND INQUIRIES

- questions regarding safe practices can be directed to a supervisor, safety officer or any member of the Joint Health and Safety Committee
- information regarding the properties and health effects of chemicals is available in the Laboratory library or the safety office

EMERGENCY TELEPHONE NUMBERS

Director's Office:	248-3015
Security after hours:	248-3035
Fire, Ambulance, Police	9-911

B. EMERGENCY PROCEDURES

FIRE EVACUATION

- an evacuation plan, approved by the Etobicoke Fire Department is in effect
- copies are available for review in each Section
- know where your exits and alarm pull stations are located
- know where your closest fire extinguishers are located, and how to use them
- read the instructions, do not use a water extinguisher on an electrical or solvent fire

SHOULD A FIRE OCCUR:

- call for help
- turn in alarm; the alarm is directly connected to the Fire Department
- if practical, extinguish a minor fire
- if fire cannot be contained, evacuate area closing doors and shutting off equipment if time permits
- report to the Chief Fire Warden or Fire Department Personnel at Exit #1, inner quadrangle, giving details of the location of the fire

WHEN ALARM SOUNDS:

- evacuate via closest exit at the sound of ANY fire alarm, intermittent or constant, do not use elevators
- personnel proceed to upper parking lot INSIDE the fence, keeping off the roads
- do not re-enter the building until cleared to do so by Fire Department or Chief Fire Warden
- the bells stop ringing automatically in 2 minutes - this does NOT mean the danger is over

FIRE DRILLS

- fire evacuation drills are held regularly. Employees are required to participate in these evacuation drills
- fire wardens have been designated for the various laboratory work locations
- know your fire warden
- follow all instructions issued by fire wardens during fire drills or fire outbreaks
- fire evacuation routes are designated for specific work areas, familiarize yourself with the closest fire exit route

ACCIDENT & INCIDENT REPORTING

- -all accidents causing injury, however minor, shall be reported to your supervisor immediately
- -supervisors will complete and sign a Workers Compensation Form, where applicable, and submit to the Safety Officer or Administrative Manager within 3 calendar days
- -supervisors will complete a Supervisors' Accident/Incident Report on all accidents causing injury or incidents which could cause injury. The completed forms to be submitted to the Safety Officer
- -forms are available from the Safety Office or Section secretary

PERSONAL INJURY OR ILLNESS

- -in case of serious injury or illness, contact 3015 giving Name, location and details of emergency
- -summon an ambulance if in doubt about the severity of the injury or illness, dial 9-911 giving name, address and details of the emergency
- -after hours, call 9-911 and notify security at 3035

FIRST AID

- -First Aid is available at the Safety Office
- -First Aid stations are located in all Sections, know where the stations are located and the name of a First Aider in your area
- -fill in the First Aid Record Sheet each time first aid is administered
- -take First Aid and CPR training when you get the opportunity

EMERGENCY HAZARDS

- -in case of accidental release of flammable, explosive or toxic gas, CALL FOR HELP TO WARN OTHERS
- -EVACUATE the area, shutting doors
- -notify 3015 giving name, location, identification of released substance and injuries if applicable
- -after hours call 9-911 giving all pertinent information listed above and inform security at 3035
- -should fire occur, pull fire alarm
- -do not re-enter the contaminated area until instructed to do so by authorized personnel

CHEMICAL SPILL

- -kits for flammable solvents, acids, caustics and special chemicals will be located in the laboratory as needed
- -locations should be clearly marked
- -know how to use the kit, wear adequate protective equipment
- -DO NOT attempt to clean up spill in excess of the recommended capacity of the spill kit, (usually 250ml)
- -DO NOT attempt to clean up spills of highly toxic substances or substances Designated by Regulation under the Occupational Health and Safety Act
- -DO call for help to warn others
- -DO evacuate room or area, shutting off open flames, shutting doors
- -DO telephone 3015 giving NAME, ROOM AND FLOOR, identifying the spilled substance and the approximate amount and request the Spill Team to assess and assist in clean up

HAZARDOUS PROPERTIES OF CHEMICALS

All chemicals should be regarded as potentially hazardous. Harmful Harmful effects depend on the toxicity of the material and degree of exposure. TOXICITY refers to the effect on living cells. All chemicals can be handled and used safely. Until they reach and produce effects inside the body, toxic substances are not harmful.

use safety glasses, goggles, shields and fumehoods where needed
observe good laboratory techniques to avoid contact with skin, ingestion or inhalation

The most common materials are listed below, specific information is available from your supervisor, Laboratory Library or the Safety Officer.

Acids: Inorganic: extremely corrosive, may be strong oxidizers and vapours may be toxic
Organic: irritants, may cause allergic reactions, interfere with the body's chemical reactions or cause changes in metabolism

Alkaline Material: combine with tissue protein & fat to burn deeply, contact with eye tissue could lead to blindness. For example, sodium hydroxide, potassium hydroxide, calcium hydroxide and the alkali metals

Gases: Irritating: nitrogen oxides, sulfur dioxide, hydrogen sulphide & selenide, halogens, phosgene, ammonia, etc. are toxic at low concentrations
Non-irritating: carbon monoxide, halogenated cyanides, nitriles do not irritate the respiratory tract but have serious toxic effects

Organic Chemicals: many have serious toxic effects, solvents can cause skin irritation as a result of defatting the dermal layer. The solvents are volatile and can be inhaled, some penetrate through the skin. Among the list are:

Alcohols
Ethers
Pyridine and derivatives
Glycols
Aromatic hydrocarbons
Diphenyls
Phenols and Cresols
Halogenated hydrocarbons
Ketones
Aldehydes

Nitrogen containing compounds: including Aliphatic nitro compounds affects the CNS and liver, kidney and blood
Sulphur Compounds-include mercaptans, carbon disulphide and dimethyl sulphate are extremely toxic
Aliphatic amines and ammonia: vapours irritating to mucous membranes, eyes, skin
Metals: affect the nervous system and cause nervous disorders

References:

- Merck Index 10th Edition
- Kirk-Othmer
- Patty's Encyclopedia of Industrial Hygiene
- NIOSH Criteria for Chemical Data Sheets
- Irving Sax: Dangerous Properties of Industrial Chemicals

DATA ON SOME HAZARDOUS CHEMICALS

Name	Physical Property L-liquid S-solid G-gas	Flash point °(F)	Ignition Temp °(F)	Flamm/ Limit % by vol		Health					Fire Fighting				Storage			
				lower	upper	skin	eye	respiratory	toxic	explosion	water	chemical	CarbDioxide		isolate	separate	keep from heat	keep from moisture
Acetaldehyde	L	-36	365	4.1	55	X	X	X	X	*	X	X	X		I		X	
Acetic Acid	L	109	800	5.4	16	X	X	X	X	*		X	X			S		
Acetic Anhydride	L	129	734	2.9	103	X	X	X	X	*		X	X			S	X	X
Acetone	L	0	1000	2.9	103	X	X	X	X	*		X	X			S	X	
Acetyl chloride	L	40	734			X	X	X	X	*		X	X				X	X
Acetyl peroxide	L					X	X	X	X	X		X			I		X	
Ammonia anhydrous	G		1204	16	25	X	X	X	X		X	X	X			S	X	
Ammonium Nitrate	S						X	X	X	X	X					S		
Ammonium Perchlorate	S								X	X					I		X	
Aniline	L	158	1418	1.3		X	X	X	X	*	X	X	X			S		
Barium Peroxide	S								X	X		X				S		X
Benzene	L	12	1044	1.3	7.1	X	X	X	X	*	X	X	X		I			
Benzoyl Peroxide	S								X	X	X				I			
Beryllium	S					X	X	X	X	*		X			I			X
Bromine	L					X	X	X	X		X					S		X
Butyl Alcohol	L	84	689	1.4	112	X	X		X	*		X	X					
Calcium Carbide	S					X	X	X	X	*		X			I			X
Calcium Cyanide	S					X	X	X	X							S		X

*Vapours may form explosive mixtures with air.

Flashpoint: the lowest temperature at which a substance will volatilize to yield sufficient vapour to form with air a flammable gaseous mixture
Ignition : the temperature at which combustion occurs
Flammable Limits : the flash point is the temperature of the lower explossive limits of a substance. The higher mixture is the maximum concentration of vapour with air which will sustain combustion
Reference : Van Nostrand's Scientific Encyclopedia

DATA ON SOME HAZARDOUS CHEMICALS

Name	Physical Property L-liquid S-solid G-gas	Flash point °(F)	Ignition Temp °(F)	Flamm/ Limit %		Health					Fire Fighting				Storage			
				by vol													keep from	
				lower	upper	skin	eye	respiratory	toxic	explosion	water	chemical	CarbDioxide		isolate	separate	heat	moisture
Calcium Hypochlorite	S					X	X	X	X		X					S		X
Carbon Disulphide	L	-22	212	1.3	4.4	X	X	X	X	*		X	X		I		X	
Cellulose Nitrate	S	55					X		X	X	X				I		X	
Chlorine	G					X	X	X	X	X						S		
Chlorosulfonic Acid	L					X	X	X	X	X						S		
Cresol(Ortho)	L	178	1110	1.4		X			X	*	X	X	X			S		
Cresol(Meta) Cresol(Para)	L	202	1038	1.1		X			X	*	X	X	X			S		
Cyanamide	S	285 melts @ 113				X	X	X	X	X		X	X					X
Cyclohexane	L	-4	500	1.3	8.0			X	X	*		X	X				X	
Diborane	G		100	0.9	98			X	X				X		I		X	
Dioxane 1,4	L	54	356	2.0	22	X	X	X	X	*	X	X	X		I		X	
Ether (Ethyl/ Diethyl)	L	-49	356	1.9	48			X	X	X		X	X		I		X	
Ethyl Acetate	L	24	800	2.5	9.0	X	X	X	X	*	X		X				X	
Ethyl Alcohol	L	55	739	4.3	19	X	X	X	X		X	X	X				X	
Ethyl Chloride	L	-58	966	3.8	154	X	X	X	X	*	X	X	X				X	
Fluorine	G					X	X	X	X	X					I		X	
Hexane(normal)	L	-7	502	1.1	7.5		X		X	*		X	X		I		X	
Hydrazine	L	100	75-518	4.7	100		X	X	X	*		X	X			S	X	
Hydrochloric Acid	L					X	X	X	X	X	X					S		

*Vapours may form explosive mixtures with air.

DATA ON SOME HAZARDOUS CHEMICALS

Name	Physical Property L-liquid S-solid G-gas	Flash point °(F)	Ignition Temp °(F)	Flamm/ Limit %		Health				Fire Fighting					Storage			
				by vol													keep from	
				lower	upper	skin	eye	respiratory	toxic	explosion	water	chemical	CarbDioxide		isolate	separate	heat	moisture
Hydrogen Cyanide	L	0	1000	6.0	41	X	X	X	X	*		X	X		I		X	
Hydrogen Fluoride	L					X	X	X	X	X	X					S		
Hydrogen Peroxide	L					X	X	X	X	X	X				I			
Hydrogen Sulphide	G		500	4.3	45		X	X	X	*		X	X		I		X	
Lead Nitrate	S								X	X	X					S		X
Magnesium	S									X		X			I			X
Methyl Alcohol	L	52	867	7.3	36			X	X	*	X	X	X		I		X	
Methylamine Mono	G		806	4.9	21	X	X	X	X	*		X	X				X	
Dimethylamine	G		806	2.8	144	X	X	X	X	*		X	X				X	
Trimethylamine	G		374	2.0	116	X	X	X	X	*		X	X				X	
Methyl Methacrylate	L	50				X	X	X	X	*		X	X			S	X	
Monochloro/ benzene	L	84	1180	1.3	7.1	X	X	X	X	*		X	X					
Naphthalene	S	174	979	0.9	5.9	X	X	X	X	*	X	X	X			S	X	
Nitric Acid	L					X	X	X	X	X	X					S		
Nitroaniline	S	390							X		X	X	X				X	X
Nitrobenzene	L	190	900	1.8			X		X	*		X	X			S	X	
Perchloric Acid	L					X	X	X	X	X	X					S		
Phenol	S	175	1319			X	X	X	X	X	X	X	X			S	X	
Phosphorus- Red	S		500				X		X	X	X					S		
Phosphorus-																		

*Vapours may form explosive mixtures with air.

DATA ON SOME HAZARDOUS CHEMICALS

Name	Physical Property L-liquid S-solid G-gas	Flash point °(F)	Ignition Temp °(F)	Flamm/ Limit %		Health				Fire Fighting					Storage			
				by vol		skin	eye	respiratory	toxic	explosion	water	chemical	Carb Dioxide		isolate	separate	keep from	
				lower	upper												heat	moisture
White/yellow	S	86	549			X	X	X	X	X	X					S		
Picric Acid	S		572				X	X	X	X	do not fight				I		X	
Potassium	S					X	X	X	X	X		X	X		I		X	
Potassium Chlorate	S								X	X	X					S		
Potassium Cyanide	S					X			X							S		X
Potassium Hydroxide	S-L					X	X	X	X		X					S		X
Potassium Nitrate	S						X		X	X	X					S		X
Potassium Permanganate	S						X			X	X					S		
Silver Nitrate	S					X	X	X	X		X					S		
Sodium	S					X	X	X	X	X		X	X		I		X	X
Sodium Hydroxide	S					X	X	X	X		X	X				S		X
Sodium Peroxide	S					X	X	X	X		X		X			S		X
Sodium Sulphide	S					X	X		X	X	X					S		
Strontium Nitrate	S								X		X					S		
Styrene	L	90	914	1.1	6.1	X	X	X	X	*		X	X				X	
Sulfuric Acid	L					X	X	X	X			X				S		X
Tetraethyl Lead	L	200				X	X	X	X	*	X	X	X		I		X	

*Vapours may form explosive mixtures with air.

DATA ON SOME HAZARDOUS CHEMICALS

Name	Physical Property L-liquid S-solid G-gas	Flash point °(F)	Ignition Temp °(F)	Flamm/ Limit % by vol		Health				Fire Fighting					Storage		keep from	
				lower	upper	skin	eye	respiratory	toxic	explosion	water	chemical	Carb Dioxide		isolate	separate	heat	moisture
Trinitro benzene	S							X	X	X	do not fight				I		X	
Vinyl Chloride	G		882	4	22	X			X	*		X	X				X	
Xylene(ortho)	L	90	867	1.0	6.0	X		X	X	*	X	X	X				X	
Xylene(meta)	L	84	982	1.1	7.0	X		X	X	*	X	X	X				X	
Xylene(para)	L	81	984	1.1	7.0	X		X	X	*	X	X	X				X	

*Vapours may form explosive mixtures with air.

TABULATE DATA ON OTHER HAZARDOUS CHEMICALS USED IN YOUR WORK

DATA ON SOME HAZARDOUS CHEMICALS

Name	Physical Property L-liquid S-solid G-gas	Flash point °(F)	Ignition Temp °(F)	Flamm/ Limit %		Health				Fire Fighting					Storage			
				by vol		skin	eye	respiratory	toxic	explosion	water	chemical	Carbon Dioxide		isolate	separate	keep from	
				lower	upper												heat	moisture

C. SAFE LABORATORY PRACTICE

GENERAL LABORATORY CONDUCT

- -follow instructions implicitly
- -perform only authorized experiments
- -protect eyes, face, hands and body with adequate safety equipment
- -practice good housekeeping, keep work area clean and tidy
- -know how and where to get help fast
- -learn basic First Aid
- -know locations of First Aid kits, First Aiders, fire extinguishers, fire exits and eyewash stations
- -report ALL accidents and unusual occurences to your supervisor
- -Don't "fool around". It's dangerous. Your work requires constant alertness for the safety of others as well as yourself. Mental alertness is the most important key to safety. Review each days work and each job for potential hazards before you start.
- -equipment presenting a fire or explosion hazard should not be operated unattended

LABORATORY HOUSEKEEPING

.DO....practice good housekeeping. Keep your bench clean. Wipe up spills immediately. Dispose of waste in proper manner

.DO....keep only enough chemical supplies for daily needs; an over supply of chemicals may create a hazard

.DO....keep aisles, exits, eyewashes, safety showers and fire extinguishers clear of obstructions

.DO....separate incompatible chemicals in storage

.DONT..store corrosive chemicals above eye level

.DONT..wedge laboratory doors open; fire doors are self closing for your protection. The Ontario Fire Code requires that they remain closed

.DONT..store apparatus on bench edge where it may be knocked off or allow equipment to protrude beyond the edge of the bench

STORAGE & LABELING OF CHEMICALS

-label all chemicals, samples and reagents clearly
-reactive chemicals should be stored separately
-corrosive chemicals should be stored on low shelves or cupboards
-store concentrated acids in containers capable of containing or spill
-flammable chemicals should be kept to a minimum. When not required for immediate use, store flammables in approved storage cabinets
-replace caps on all volatile chemicals in use
-chemicals which will form peroxides, should be dated and initialed when opened, should contain a suitable inhibitor during prolonged
-storage, and remain the responsibility of the purchaser

WASTE CHEMICAL & HAZARDOUS SAMPLE DISPOSAL

-Liquid & solid waste which cannot be safely neutralized shall be disposed of in the following manner:

-waste chemical labels, available through stores, shall be completed identifying the substance(s), percentage of each substance and signed by a supervisor or senior staff
-chemicals contaminated by a restricted, toxic or environmentally hazardous substance are stored for pickup by a licenced waste disposal company
-chemicals will be accepted by the senior stores clerk on the 1st and 3rd Thursday of the month between 9:30 a.m. and 12:00 noon
-Hexane, Acetone and Methylene chloride not contaminated by a restricted or designated substance may be returned to stores for recycling. Drums for this collection are located in the flammable storage room. Access shall be obtained through stores personnel. Laboratory staff are responsible for transferring the waste solvents. Staff shall use and wear adequate protective equipment during transfer
-hazardous waste samples, waste contaminated by PCB, dioxins, radioactive material or other restricted substances, shall be disposed of by supervised staff only, in a manner approved by laboratory procedures and/or authorities having jurisdiction

TRANSPORTATION and USE OF CHEMICALS

-chemicals shall only be transported within the complex in modified Laboratory carts equipped with trays to contain a possible spill
-use bottle carriers to transport acidic or corrosive substances
-fluids should be poured without removing bottle from carrier, using a funnel
-use pumps whenever possible to dispense acidic or corrosive substances

- -use extreme care when using highly reactive or unstable chemicals. When combining reactive chemicals, keep the quantities to a minimum
- -exothermic (heat generating) reactions should be carefully controlled

PIPETTING

- -all pipetting shall be accomplished by means of a mechanical pipet. Pipetting by mouth is not permitted.

SAMPLES

- -all samples should be handled with caution
- -samples may contain bacteria, viruses, corrosives, volatile or toxic substances
- -wear gloves and practice good hygiene when handling sample bottles
- -samples identified as potentially hazardous should only be opened in a fumehood or ventilated cabinet
- -broken or leaking samples received in sample reception without submission sheets available on the exterior of the package, should be set aside. Senior laboratory personnel will determine whether the sample should be discarded or processed
- spilled samples should be cleaned up promptly using appropriate protective equipment

D. SAFE OPERATION OF LABORATORY EQUIPMENT

HANDLING AND DISPOSING OF GLASSWARE

-never use broken or chipped glassware

-sharp or rough edges should be fire polished or ground smooth

-when inserting glass tubing into stopper; match diameters of hole tubing, moisten tubing and hole, hold tubing close to hole keeping tubing in line, and apply only sufficient pressure to insert slowly. Wear gloves that will pad the hands or use cloths

-when assembling apparatus make sure that all parts are supported evenly

-never use glass for pressure or vacuum work unless designed for that pressure

-glass equipment under pressure or vacuum should be shielded to protect any worker from glass fragments in the event of failure.

-acid or solvent washing of glassware should be performed using adequate protective equipment in a well ventilated area. Glassware should remain in fumehood or ventilated canopy until all acid or solvent vapour has evaporated

-broken glassware should be swept up and discarded in the 'yellow' glass only buckets. Never place broken glass or syringes in waste baskets. The cleaning staff may be injured

-glassware used for hazardous and radioactive samples should be considered as hazardous waste until properly decontaminated

DISTILLATION

-inspect equipment for flaws

-use boiling chips to avoid bumping where this may occur

-do not fill distillation flasks more than three quarters of rated capacity

-use steam, hot water, or a heating mantle for distillation of flammable material. Locate apparatus in a fumehood or ventilated canopy remote from sources of ignition

-distill irritating or toxic materials in a fumehood or ventilated cabinet

-cool distillation equipment to permit safe handling before dismantling

CRYOGENS

-cryogens have boiling points from -100°C to -270°C

-cryogenic liquids and compressed gases have many properties in common. Many cryogens are available as compressed gas.

Ethylene
Methane
Oxygen

Helium
Fluorine
Argon

Carbom monoxide
Nitrogen
Hydrogen

-additional problems arise because these liquids (and gases) are so very cold
-always wear eye protection, preferably a face shield
-do not wear gloves which can freeze to the skin, use a pot holder
-contact with cryogenic liquids and their gases represent a serious hazard to living tissue through frost bite or freezing. The hazard is comparable to boiling water or steam.

FUMEHOODS

.DO....use fumehoods for any process that may cause toxic vapours, mists, or dusts to be released into the atmosphere
.DO....operate fumehoods with front sash as low as practicable to capitalize on the air flow across the face of the hood

.DONT..block the rear slot with apparatus and stored items
.DONT..block the front slot with apparatus and stored equipment
.DONT..open doors or windows immediately adjacent to fumehoods; the air flow may be disturbed causing vapours to be drawn back into the room
.DONT..use an open flame or electrical equipment in a fumehood where flammable or explosive vapours are present

EQUIPMENT UNDER PRESSURE OR VACUUM

-the hazard from implosion should be considered the same as explosion
-all glass equipment should be inspected for flaws
-the risk of glass breakage increases as the contained pressure changes from atmosphere, the hazard is further increased proportionately with the size of the equipment. Pressure that would not cause breakage in a 1/4" tubing could cause serious results in a 5 litre flask
-all apparatus under pressure/vacuum should be shielded by a screen or confined to a fumehood
-all Dewar flasks should be taped; vacuum dessicators protected by expanded metal shields or equivalent

COMPRESSED GAS - TRANSPORTATION, STORAGE & USE

-cylinders of compressed gas shall be transported by means of a hand truck, in an upright position, securely chained with the valve cap on
-staff transporting or moving cylinders shall wear CSA approved safety footwear
-when positioned for use, cylinders shall be securely fastened upright position
-use correct pressure regulator for a single gas, open and close cylinder using the main valve
-do not use gas or air under pressure to clean equipment or clothing

-arrange for removal of empty cylinders promptly
-check cylinders, valves, regulators and tubing for leaks or weaknesses
-do not use flame to check for leaks; use correct testing methods and equipment

ELECTRICAL HAZARDS

-all electrical equipment used in the Laboratory shall comply with the Ontario Hydro Code or have CSA approval
-modifications to electrical equipment shall comply with CSA or Ontario Hydro Code and must be performed by a competent person
-do not tamper with permanent fixed receptacles, electrical panels, or attempt any electrical hook-up to service; notify the MGS for electrical work
-turn off and unplug all equipment before servicing
-do not overload circuits; avoid octupus plugs and extension cords. Use CSA approved power bars
-check all cords and plugs on portable equipment; make sure equipment is grounded, report electrical hazards to your supervisor
-where an explosive atmosphere may be present explosion-proof fittings are required
-static electricity can cause ignition in an explosive atmosphere flammable solvent drums or dispensing containers should be bonded and grounded
-check all electrical fixtures, plugs, cords, power bars etc. for corrosion and cracks

E. PROTECTIVE CLOTHING AND SAFETY EQUIPMENT

GENERAL ATTIRE

- wear clothing suitable for the job
- ties, rings, necklaces and long hair may be hazardous near moving machinery or in the laboratory

EYE PROTECTION

- the Ministry provides CSA approved safety glasses with side shields to all employees working in an area identified as potentially hazardous to the eye. Regular Ministry employees in these areas requiring prescription safety glasses are reimbursed up to the maximum amount agreed to by Collective Agreement
- eye protection shall be used or worn at all work stations identified as potentially hazardous to the eyes
- fully enclosed splash goggles are available in stores; goggles should be used when handling concentrated corrosive liquids
- contact lenses shall not be worn where chemicals are handled the OHSA requires adequate eye protection to be used or worn where there exists a hazard of injury to the eye

HAND PROTECTION

- select gloves to protect your hands from acids, solvents, toxic substances, glass handling, welding, heat, electrical contact or cryogenic substances
- check the specifications on package or from supplier before selecting
- check for leaks before use

FOOTWEAR

- laboratory workers shall wear shoes that provide adequate foot and toe protection
- stores personnel and field workers shall wear CSA approved safety boots or shoes
- the OHSA requires that adequate safety footwear shall be worn where there exists the hazard of injury to the foot

LABORATORY COATS

- laboratory coats shall be worn by all workers in areas where contact with chemicals or infectious agents may occur
- coats should be worn buttoned
- coats shall not be worn in any area where food, drink or tobacco is present, in the auditorium or in any area that is signed 'NO LAB COATS'

EYE WASH FOUNTAINS AND DELUGE SHOWERS

- -know the location of the nearest eye wash in your workplace
- -know how to operate fountains and showers
- -keep area clear of obstructions

SPILL KITS AND SPILL STATIONS

- -spill kits for clean up of small spills of acids, caustics, flammable solvents and special chemicals are available through stores
- -know location in your lab
- -know how to use the neutralizing agents
- -wear or use protective equipment
- -call for spill team if assistance is needed

RESPIRATORY EQUIPMENT

- -self contained breathing apparatus (SCBA) is stored and maintained in the safety office
- -SCBA is to be used by trained personnel only
- -cartridge face masks may be used where low concentrations of organic or acid vapours may be encountered for a short duration, by persons under the direct control of a supervisor who is aware of the limitations of this equipment

FIRE PROTECTION EQUIPMENT

- -know the location of fire extinguishers
- -know how to operate the extinguishers in the laboratory
- -know location of fire blankets and how to use them

F. OFFICE SAFETY

TRIPPING HAZARDS

-keep extension cords, telephone and computer cables under furniture and off the floor if possible
-arrange office furniture so that floor plugs or connectors are covered
-do not obstruct exits or aisles to exits

FILE CABINETS

-load filing cabinets or free standing shelves from the bottom up
-open one file drawer at a time
-never leave any drawer open
-make sure all stacked cabinets are securely fastened to prevent tipping

STEP STOOLS

-do not use chairs on wheels or castors as step stools
-do not attempt to remove heavy equipment, journals or books located above eye level. If a ladder is required, get assistance to steady the ladder and receive the load

CHEMICALS IN THE OFFICE

-chemicals are present in the office environment, duplicating fluids, 'white out' correction fluids, rubber cement and others
-avoid breathing chemical vapours, keep securely capped when not in use
-keep only sufficient supply for immediate use

ELECTRICAL HAZARDS

-damaged electrical cords should be replaced immediately
-damaged plugs with bent or broken ground pins should be replaced
-ensure that electrical cords are not walked on or crushed with heavy furniture, this could lead to a short circuit and electrical fire

POSTURE

-adjust chair height and back rest to your size
-sit with knees higher than pelvis to reduce back strain
-physical movement relieves stress and fatigue - stretch and move around at least every hour

LIGHTING & VDT OPERATIONS

-position your desk or work station to take advantage of natural or artificial light

-make sure computer or word processing terminals are screened or positioned to reduce glare

ACCIDENT/INCIDENT REPORTS

-all accidents/incidents must be reported to the supervisor immediately

G.GENERAL SAFETY

VEHICLE ACCIDENTS

- -all accidents involving Ministry vehicles or accidents while driving on Ministry business must be reported
- -completion of Ministry accident reports is required

MATERIAL HANDLING

- -forklift trucks and manual lift trucks shall be operated only by a competent person
- -the operator must have a clear view of the travelled path
- -trucks must not be operated in reverse except to turn around and then only if the operator has a clear view
- -wheeled equipment shall not be raised or lowered on dock leveller or hoist unless wheels are chocked securely
- -no person shall ride or accompany freight while hoist is raised or lowered
- -empty pallets shall be laid down and stacked

LIFTING AND CARRYING

- -do not attempt to lift heavy objects alone, ask for assistance or use of a mechanical lifting device operated by a competent person
- -feet should be shoulder width apart
- -one foot beside, one foot behind the article to be lifted
- -bend knees
- -keep back straight
- -lift by straightening legs
- -keep arms and elbows close to body
- -BEFORE TURNING: move your feet in the direction you wish to travel before you twist your upper body.

ELEVATORS

- -use freight elevators for carts or equipment
- -push cart in first
- -do not cover photo-cells, use manual 'door open' button to hold door open
- -should elevator stop between floors, do not panic, lift telephone receiver inside car, and wait for instructions. Give nature of emergency, and elevator number. Ring alarm button
- -if you are outside elevator and hear the alarm bell, telephone MGS at -3921 or -3570 and tell person in elevator that help is on the way
- -do not force doors or tamper in any way with elevator
- -do not use elevators during any fire alarm or evacuation order

VISITORS

- ensure that visitors comply with Laboratory safety procedures
- provide visitor safety glasses in designated areas or where a hazard to the eyes exist
- be prepared to direct visitors to safe exits in the event of an evacuation

SMOKING

- smoking is forbidden in chemical storage areas, elevators, the auditorium and all areas designated by no smoking signs
- no smoking is permitted in any laboratory or area where flammable liquids or an explosive atmosphere may be present

FOOD AND DRINK

- no food or drink shall be brought into, stored or consumed in an area where substances poisonous by ingestion are present

H. FORMS

WCB Form 7
Supervisor's Accident/Incident Form
Employee Orientation Form

Workers' Compensation Board
Commission des accidents du travail

2 Bloor Street East
Toronto, Ontario
M4W 3C3

H2

Employer's Report of Accidental Injury or Industrial Disease

● *Please see reverse for further details.*

Claim No.

Employer Identification

Firm Name	Firm No.	Rate No.	Phone No.
Address	City/Town	Province	Postal Code
Plant, dept., or worksite where employed	Worker Reference No. Ⓐ	Miner's Certificate No.	

Worker Identification

Last Name	First Name	Sex	Marital Status	Area Code	Phone No.	Date of Birth day month year	
Address (no., street, apt.)			City/Town		Province	Postal Code	
Date of Employment day month year	Occupation at time of the injury and years of experience in that occupation	Years Exp.	Language Spoken if not English Ⓑ		Social Insurance No.		

Date and hour of accidental injury day month year time m	Ⓒ Date and hour reported to employer day month year time m	Name and address of attending physician(s)

History of Accidental Injury or Industrial Disease Ⓓ

1. What happened to cause the injury?
2. Explain what the worker was doing and the effort involved.
3. Identify the size, weight and type of equipment or materials involved.
4. Describe injury, part of body involved and specify left or right side.
5. Where did the accident occur?
6. What conditions contributed to the accident and what steps have been taken to prevent recurrence?
7. Give the names and addresses of witnesses or persons having knowledge of the injury.

Claim Information

Please answer ALL questions — Explain "Yes" answers at the bottom of this section or attach a letter if necessary.

	No	Yes
Ⓔ 1. Is the injured person an owner, spouse of the employer, (sub) contractor or executive of the business?	☐	☐
2. Did the accident happen outside Ontario? If yes, state Canadian province or country. ______	☐	☐
3. Was anyone not in your employ totally or partially responsible for the accident?	☐	☐
Ⓕ 4. Do you have any reason to doubt the history of injury?	☐	☐
5. At the time of injury, was the worker doing work other than for the purpose of the employer's business?	☐	☐
Ⓖ 6. Was there any serious and wilful misconduct involved?	☐	☐
Ⓗ 7. To your knowledge, has the worker had a previous similar disability?	☐	☐
8. Do you have any information that the worker could have returned to work earlier?	☐	☐

Earnings and Lost Time Information

Ⓘ Complete this section if the worker will be totally or partially disabled beyond the day of injury.

Date and hour last worked m

Date and hour returned to work m

Ⓙ Provide the average gross earnings on the day of injury and specify: ☐ hourly ☐ daily $

Normal working hours on last day worked From m To m

Estimate length of time off work

Earnings for last day worked

Normal earnings for last day worked

Ⓜ Enter worker's normal working days by: F = full day H = half day and total weekly pay hours.	S	M	T	W	T	F	S	Total

Ⓚ Specify type of any additional benefits and weekly value $

If the worker worked after the first layoff, please enter dates. From m To m

Ⓛ From Revenue Canada TD1 form provide:

Net Claim For Exemption $

Net Claim Code

Ⓝ If you have advanced or will be advancing anything to cover period of disability, give particulars including dates covered.

Identify type of employment

☐ Full time ☐ Part time ☐ Casual (Occasional)
☐ Independent Operator ☐ Apprentice

Status	Injury	Injury	Forms	Sig.	App.

Ⓞ Authorized Signature

Official Title

Date

0007 (10/83)

0007

H3

Ministry
of the
Environment
Ontario

Supervisor's Accident/Incident Investigation Report

To Be Sent to Regional Safety Officers

Part of Body

Arm	A
Back	B
Torso	T
Skull	S
Eye	E
Foot	F
Leg	L
Hand	H
Other	O

Section

Branch Address

Exact Location of Accident

Date of Occurrence

Time ☐ A.M. ☐ P.M.

Date Reported

Injured's Name

Date Employed

Age

Occupation

Time on Job

Nature of Injury

Will Lay Off Exceed Day of Accident? Yes ☐ No ☐ Estimate No. of Days ______

Object/Equipment/Substance Inflicting Injury

Person with Most Control of Object/Equipment/Substance

DESCRIPTION

History of Accident (where, what he was doing, cause of injury and names of witnesses) Previous Similar Disability Yes ☐ No ☐

Injury Type

Cut	1
Bruise	2
Scratch	3
C. Burn	4
T. Burn	5
Derm.	6
Punc.	7
Sprain	8
Fracture	9
Fumes	10
F. B.	11
Other	12

What Acts, Failures To Act And/Or Conditions Contributed Most Directly to this Accident?

What Are the Basic or Fundamental Reasons for the Existence of the Above?

Code

Any person not in our employ involved in or to blame for Accident? Yes ☐ No ☐

State what the injury consisted of, the part of the body involved, and specify right or left side, if applicable

Loss Severity Potential ☐ Major ☐ Serious ☐ Minor

Probable Recurrence Rate ☐ Frequent ☐ Occasional ☐ Rare

Corrective Action

Describe Corrective Action – Already Taken/Planned But Not Yet Taken/Recommended

Corrective Action Recommended Above has been Taken ______ Date ______ Supervisor

	Result		**Type of Incident (see definitions on reverse side)**				**Corrective Action**	
No Claim	Hazardous Situation:	☐	1. Struck By	☐	7. Caught Between	☐	Employee Reinstructed	☐
	First Aid	☐	2. Contacted By	☐	8. Fall To Below	☐	Unsafe Condition Corrected	☐
			3. Struck Against	☐	9. Foot Level Fall	☐		
WCB Claim	Medical Aid	☐	4. Contact With	☐	10. Exposure	☐	Work Methods Analysed	☐
	Compensation (Lost Time)	☐	5. Caught In	☐	11. Over Exertion	☐	Under Investigation	☐
			6. Caught On	☐	12. Patient Action	☐		

Comments:

______ Date

______ Signature of Department Head or Supervisor

MOE 1133 (4/78)

Ensure WCB Form 7 is Completed.

EMPLOYEE SAFETY ORIENTATION RECORD

NAME: ____________________

POSITION: ________________

SECTION: __________________

DATE OF HIRE: _____________

Pertinent sections of the Ministry of the Environment Safety Program extracted from the material below was reviewed with me by the Ministry of the Environment Safety Officer.

1. Occupational Health and Safety Act
2. Ministry of the Environment Safety Manual
3. Laboratory Safety Manual
4. Function of the Occupational Health & Safety Committee
5. Accident reporting procedures
6. Duties of Supervisor and Worker
7. Ministry policy on personal protective equipment including head, eye, foot and skin protection
8. Employee Health Interviews or Medicals where applicable

My immediate Supervisor also reviewed the following with me, supported by written instructions where applicable.

1. Safe work procedures governing site specific Laboratory functions
2. Use of all equipment required to perform work activities, including protective equipment
3. The existence of any potential hazard to the health and safety of the worker of which the Supervisor is aware.

It is understood the verbal and written material given to me during the briefing does not constitute the entire Ministry of the Environment Safety Program and any concerns that were not addressed and that arise during employment can be discussed with my Supervisor, a Safety Committee Member or the Safety Officer.

SIGNED

EMPLOYEE ________________ DATE ____________________

SUPERVISOR ______________ DATE ____________________

SAFETY OFFICER __________ DATE ____________________